



**Conference Notes**  
**“The Future Ain’t What it Used to Be:**  
**Planning for Climate Disruption”**

**Summary of Municipal Water Supply Breakout Session**

**October 27, 2005**  
**Qwest Field Conference Center**  
**Seattle, Washington**  
**Sponsored by King County**

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Information on the conference is available at:  
<http://metrokc.gov/climateconference2005>

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**“The Future Ain’t What it Used to Be: Planning for Climate Disruption”**  
**October 27, 2005**  
**Seattle, Washington**

**Summary of Municipal Water Supply Breakout Session**

On Thursday, October 27, 2005, King County hosted a one day meeting to engage a broad cross-section of Washington State governments, businesses, tribes, farmers, non-profits, and the community-at-large in a dialogue about climate change impacts and potential adaptations in Washington State. The following is a summary of the Municipal Water Supply breakout session presentations and discussion. More information on the meeting, including electronic copies of the breakout session presentations, is available at the conference Web site, <http://metrokc.gov/climateconference2005>.

The Municipal Water Supply morning breakout session addressed “Problem Definition.” This session included presentations by Dr. Richard Palmer (University of Washington), Chris Pitre (Golder Associates), and Alan Chinn (Seattle Public Utilities) in the morning. The presentations were followed by a question and answer session with the audience, moderated by Jim Miller (City of Everett).

The afternoon breakout session covered “Preparedness and Adaptation.” Panelists included Virginia Stern (Washington Department of Health), John Kirner (Tacoma Public Utilities), David Brown (Yakima Water and Irrigation Utilities), Doug McChesney (Washington Department of Ecology), and Don Theiler (King County Wastewater Treatment Division). They participated in a panel discussion of climate change effects on the regional municipal water supply led by Andrew Graham (HDR Engineering, Inc.). Questions and comments from the audience supplemented the discussion.

Andrew Graham summarized results of the Municipal Water Supply breakout session in an afternoon report to the plenary:

- Municipal water systems already face water scarcity and variability due to other factors. Climate change will accelerate and exacerbate this situation.
- Both surface and ground water systems are vulnerable and need to become more flexible and robust to changes in hydrology.
- Planning is the greatest need at the present time. Plans need to be made and continually updated. We need to move from the model of emergency drought response to one of preparedness. Small systems are very vulnerable and have fewer resources to address the problem. Planning needs to look at multiple scenarios of supply and demand effects and how they interact with a given water system’s specific vulnerabilities.
- The “toolbox” for adaptation will include water conservation, storage (in both surface reservoirs and aquifers), wastewater reuse, operational management, pricing. Solutions need to be coordinated with efforts to manage growth, water rights, and environmental resources. These tools all can improve flexibility to manage scarcity. Regional collaboration among water systems can enhance these tools. Active support from the public and elected officials is also needed.

- Improved information is needed to enable water systems to respond appropriately to the risks of climate change. For example, scenarios need to be developed for the impacts of climate change on ground water systems in the state. We also need improved tools for real-time sensing in watersheds, to improve flexibility of operations and better manage resources in dry years. Finally, it will be important to improve predictions on precipitation effects, including how they may affect demand for water by consumers.

### ***Participants***

The Municipal Water Supply breakout session attracted 123 participants. Approximately 67% of the registered attendees work for governmental organizations, 18% were from private businesses, and the remaining 15% were comprised of non-profit employees, students, and individuals from the community.

<h3><b><i>Morning Session: Presentations</i></b></h3>
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***Moderator:*** Jim Miller, City of Everett

***Presenters:*** Dr. Richard Palmer, “Impacts of Climate Change on Municipal Supplies in Washington.” A copy of the presentation can be found on the conference’s website.

Chris Pitre, “Potential impacts of climate change on groundwater systems used by the municipal water supply.” A copy of the presentation can be found on the conference’s website.

Alan Chinn, P.E., “Global Climate Change and Its Potential Effects on Seattle’s Water Supply.” A copy of the presentation can be found on the conference’s website.

### ***Discussion Summary***

***Question:*** How would Seattle Public Utilities have fared if not for the exceptionally wet spring?

***Alan Chinn:*** In 2005, we did not have an exceptionally wet spring in our watersheds. If you look at the precipitation data for our Cedar and South Fork Tolt River Watersheds where our water supply reservoirs are located in the Cascade Mountains, you will find that our watersheds received just normal amounts of rain in the spring. I would like to mention that when we ran our analyses using our watershed computer simulation and water forecast model back in March and April, we knew that if we had just normal amounts of precipitation in May, June and July that we had a chance for our water supplies to return to normal, despite experiencing the lowest snowpack on record at 25% of normal, and following one of the driest winters on record. As you know, our water supply situation returned to normal conditions by early July 2005 and we lifted our water supply advisory.

*Comment from the audience:* The region has faced dry spells in the past. On the Green River this year we saw 37 consecutive days of the lowest flows on record for the date. Then we received normal rainfall in the spring and early summer, and it was enough to mitigate the immediate threat. We have been repeatedly lucky for 30 years that droughts have broken in the nick of time. However, it won't always be this way; long term tree ring studies have shown us that. Anyone who manages a water utility and didn't feel a little nervous this spring must have nerves of steel.

*Question:* I think Seattle Public Utilities did well in managing its water supply this year. Using a dynamic management approach rather than a static reservoir rule curve to manage its reservoir storage levels is the right thing to do. My question is, are you implying that Seattle Public Utilities can adapt to any set of conditions and that we don't need to worry about future climate change impacts to water supply?

*Alan Chinn:* No, I am not implying that. What I was saying in my presentation was that this year provided an opportunity for Seattle Public Utilities to push at the boundaries of our system and test the inherent flexibility within our own water supply system to manage through an extremely low snowpack year. Using our real-time sensors and dynamic management approaches, we captured the last big rain storm of the winter, storing some extra 5 feet of water in our mountain storage reservoirs in mid-January. We did this recognizing actual watershed conditions and without compromising flood management objectives. We are learning from experiences like these and will continue to make investments in our system that enhance our flexibility and strengthen our vulnerabilities.

*Question:* Shouldn't we be doing any long-range planning to prepare for climate change impacts further out into the future? Is there a need in the Seattle system for more storage capacity or flood control?

*Alan Chinn:* Seattle Public Utilities is incorporating climate change information into our long-range planning processes now. We have a new water planning model that looks at the relationships between decisions or choices we can make, the many uncertainties associated with long-range planning, and what we value for our system. Climate change information is being included in our new water planning model.

*General Comment:* In the Global Climate Models (GCMs) there is uncertainty about precipitation, but all the simulated scenarios predict a warmer future. Planning should incorporate increased temperature that all the scenarios predict.

## ***Afternoon Session: Panel Discussion***

***Moderator:*** Andrew Graham, HDR Engineering, Inc.

***Panelists:*** David Brown, Yakima Water and Irrigation Utilities

John Kirner, Tacoma Public Utilities

Doug McChesney, Washington Department of Ecology

Virginia Stern, Washington Department of Health

Don Theiler, King County Wastewater Treatment Division

### ***Purpose and Structure of the Panel Discussion***

The purpose of the panel discussion was to discuss how water utilities should prepare for and adapt to the risks posed by climate change. A handout was provided listing ten key questions (questions listed below; see also conference web site). The first four of these questions were addressed to panelists and to the audience. The remaining six served as background to stimulate discussion.

### ***Discussion Summary***

***First Question for Discussion:*** What types of decisions are affected by climate change? Do current processes factor climate change risks into these decisions?

*John Kirner:* There are two categories that should be considered: the symptoms of climate change such as temperature effects, change in runoff patterns, changes in water availability, etc. and the second category which is what can we do to address the core of the problem which is the production of greenhouse gases. Approaches that can be used to help plan for the symptoms of climate change involve making systems more flexible and adaptable. This can be done using demand management and having an active curtailment plan apart from conservation. Storage and flexibility in source of supply (e.g. water reuse) are also important. As utilities we can set the example as to how to address the root cause of our problem. We can practice energy conservation, choose smaller vehicles, and encourage our customers to do the same.

***Second Question for Discussion:*** What should climate change “preparedness” mean for Washington water utilities? What should “adaptation” mean?

*Doug McChesney:* All municipalities are different and will respond differently. However, for all utilities, there is uncertainty in the water supply. Preparedness and adaptation should be part of the same process. Adaptation can take place without preparedness, and may be forced upon those who fail to prepare, but the process is likely to be more disruptive. Utilities should take general stock of their water supply systems and assess vulnerabilities to the various climate change scenarios. It is important to develop operational strategies. Certain climate change issues should be addressed early on such as educating customers and

implementing measures to make the water supply system more robust. As more information about the impacts of climate change becomes available, plans should be adjusted to incorporate that information. It is a recursive, iterative process.

*Virginia Stern:* Many utilities think climate change is drought, but there are other issues such as flooding. The 50-year flood is coming more often than once every 50 years. This past spring we had flooding at the beginning of March and drought declared by the end of the month. There is a need for emergency planning; more water systems need to have an emergency response plan ready. Most of the emphasis is on surface water systems, but more thought towards groundwater is needed. Large surface water systems are able to adjust to operations with success, but small groundwater systems often don't know there is a problem until it is too late. Technical assistance should be offered to local health offices. There are 12,000 small systems in the region, and they often don't have a back up plan; it is important for smaller systems to focus more on preparedness for the long term interruptions that will be caused by climate change. Interties between large and small systems would help provide alternative sources and are important to consider. Creating an emergency response plan is the first step in preparing for climate change, and after an emergency plan is formed it is important to focus on long term issues.

*Audience question:* It is difficult to manage groundwater sources when there is so little information available. How will Washington state deal with this problem?

*Doug McChesney:* There needs to be a network of monitored groundwater wells established for the state. Many wells are monitored, but there is no common repository for that monitoring information. The USGS and Ecology are interested in groundwater monitoring and establishing such a database. At present, the USGS only monitors seven wells across the state, and only one real-time.

*Virginia Stern:* From 2005 it is apparent that we can't tell what is going on with groundwater; we lack an effective prediction tool. Medium and small systems lack knowledge on monitoring systems; a partnership should be made to help bridge the information gap. There are local partnerships that make groundwater models for other reasons, but applications do exist. Small systems can't be required to monitor the groundwater, but they can be encouraged.

*Moderator question:* To what extent has climate change become a topic of discussion with utility boards and commissioners?

*Audience response:* Climate change is another element of uncertainty that needs to be considered.

*Audience response:* The mayor of Redmond signed on to the City of Seattle Kyoto initiatives. All city agencies are working together to develop principles for planning responses to droughts and other emergencies. Climate change is brought up, but people often do not know what to do; monitoring is a good first step when beginning to address the problem. Scenario planning and inventories of system vulnerabilities in a highly uncertain environment are also important.

*Audience response:* Another issue is that planning groups are often uninterested in modeling for climate change and do not understand the importance. However, outside groups can create models that consider climate change and show city agencies the significance of the results.

*Audience response:* For the Woodinville Water District, problems from an overwhelming amount of impervious surfaces dwarf problems from climate change. Low impact development is more important for the time being.

***Third Question for Discussion:*** How do the following approaches contribute to preparedness: water conservation, water storage (including aquifer storage), reuse of reclaimed water, price signals and billing practices, operational modifications, monitoring and adaptive management, and surface water management?

*David Brown:* Water conservation in eastern Washington is very different than the western half. Irrigation is very important, and conservation means cutbacks in irrigation. Public education is one option, but has been unsuccessful so far. Yakima is looking at aquifer storage and recovery of water. Reclaimed water is a possibility, but it is expensive. Price signals and billing practices are also being altered; there will be a flat rate by 2008.

*Donald Theiler:* There needs to be more planning. Water should be returned as close to its original location as possible. Presently, water is being taken from a natural draining system and put into an artificial one; water is moved through the distribution systems to the waste water system and then to the Puget Sound. This system needs to be reversed: divert less water from natural systems, and what is diverted should be reclaimed and reused. Wastewater utilities need to work more closely with water utilities, on strategies which combine conservation, reclaimed water, and a new pricing system which reflects the real cost of removing water from the natural systems.

*John Kirner:* Even without climate change there would be water management concerns. Since major utilities are in close proximity to each other; interties would help spread benefits across the region and would result in a more flexible system with increased opportunities to apply the tools you have identified as potentially useful in addressing the impacts of global warming. Politics and allocation of costs are obstacles, but regional cooperation and good planning will help.

*Audience question:* Is the eastern half of Washington reusing agricultural water already?

*David Brown:* 11,000 of 19,000 domestic water customers in the Yakima area use a separate supply system just for irrigation, this water is not treated. Yakima is in the middle of the Yakima Project managed by the Bureau of Reclamation. However, this is still water being taken from the river and water used for irrigation is not metered. The water used in Yakima has water rights senior to the drinking water supply water rights. If water is in short supply due to climate changes these senior irrigation water rights could be moved to the drinking water system and metered.

*Audience question:* Water rights constrain developing new water supplies. There has been a move towards watershed planning in the last ten to fifteen years, and climate change should be looked at in the context of responses to previous shortages. How can the tools we have address different systems and different issues including growth management and environmental needs? How should uncertainties be dealt with?

*David Brown:* Utilities and planning departments need to coordinate more on water issues. Water needs should be inserted in communities' growth planning.

*John Kirner:* Regional cooperation is essential, issues must be addressed collectively. The way local governments manage land use is also important.

*Donald Theiler:* A risk analysis is needed to consider the impacts of growth, uncertainty, water rights, climate change and incorrect price signals. After that, potential solutions can be formed. Wastewater reuse can help while planning for difficult outcomes.



*Audience question:* Conservation cuts the bottom line in terms of revenues— will this loss be offset by new customers to be served by utilities?

*John Kirner:* Conservation doesn't always cut the bottom line in the short-term; it is different for each utility. When considering externalities it is always the best option in the long term. Water utilities need to be in the business of stewardship.

***Fourth Question for Discussion:*** What should water utilities be doing today? In five years? In ten years and beyond? Are there reasons to wait on some actions? What information or triggers would tell us an accelerated response is needed?

*Virginia Stern:* Water utilities should be creating emergency response plans immediately. In 5 to 10 years, there should be a shift from emergency response to preparedness and utilities should plan for alternative supplies. In the long term, information and tools should be translated from larger systems to smaller systems.

*Donald Theiler:* Utilities need to improve bottom-up analysis. Also, information and understanding of the top-down models needs to advance. Utilities need better insurance policies in the form of alternative water sources, and more cooperation between utilities, water and wastewater management systems should be created.

*Audience question:* What is the state's role in identifying new storage options?

*Doug McChesney:* The state government is involved, but only as one of many parties. Any major projects will need to serve multiple purposes and be supported by all the different interest groups. Large projects will need participation by a combination of local, state, and federal governments because of the costs.

*Audience question:* Should wastewater utilities be building purple pipes now?

*Donald Theiler:* There will be negotiations and planning with water supply utilities as to when the purple pipes for reclaimed water will be built to supply the final consumer. In this area wastewater facilities will probably supply the water utilities with reclaimed wastewater, and then each water purveyor will work with the wastewater utility to develop the distribution system of purple pipes.

***Additional Handout Questions (provided during session as background; not discussed specifically):***

5. What kinds of additional information, monitoring or modeling is needed to ensure water systems have adequate information to respond to risks of climate change? Who should gather different types of information, and how can this be coordinated?
6. Is the current state-required planning framework for water systems adequate to account for climate change? Are there additional planning steps water systems should take above and beyond state requirements?
7. How does this vary across water systems or regions with different types of supplies?
8. How can the Governor, Legislature and State Agencies help address municipal water supply issues related to Climate Change? How can the federal government help?

9. What barriers or complications arise in preparing or adapting to Climate Change?  
What should local water suppliers, state agencies or others be doing to resolve these barriers?
10. How do responses needed in the municipal supply sector interact with responses in other sectors? E.g. fisheries, forests, stormwater and wastewater, agriculture, etc.